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Maintaining Cultural Stereotypes in the Serial Reproduction of Narratives

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Recent social cognition research showed that the individual often recalls stereotype-inconsistent (SI) information better than stereotype-consistent (SC) information. By contrast, classical studies in social psychology suggest that SC information is retained well in the collective remembering where a number of individuals are involved in the reproduction of stories. In the present experiment, individual and collective remembering were examined. A story about a man and a woman who exhibited gender-stereotype-relevant behaviors was transmitted through five-person communication chains. Although participants in earlier positions of the chains reproduced SI information more than SC information under some circumstances, SC information was retained better than SI information toward the end of the chains regardless. The stability of cultural stereotypes was discussed in terms of the tendency for collective information processing to favor the retention of information shared among individuals.

On the premise that cultural stereotypes are hard to change (Lippman, 1922), various mechanisms of stereotype maintenance have been postulated and investigated in recent times (e.g., Jussim & Fleming, 1996; Maas & Arcuri, 1996; von Hippel, Sekaquaptewa, & Vargas, 1995). However, the mechanism of information retrieval, or *Remembering*, to borrow the title of Bartlett's (1932) classic book, has probably attracted the greatest amount of attention. After all, if cultural stereotypes are representations about social groups, their maintenance and modification must in part involve the process of retrieving and bringing to bear on those representations the implications of stereotype-relevant information. If stereotype-inconsistent (SI) information is more likely remembered than stereotype-consistent (SC) information, this should facilitate stereotype change. By contrast, if SC information is more memorable, it should stabilize stereotypes. Whichever is more memorable should have implications for stereotype stability and change.

Remembering, which is broadly defined as retrieval of information, can involve both individual and collective processes (e.g., Bartlett, 1932; Middleton & Edwards, 1990; Stephenson, Brandstatter, & Wagner, 1983). Especially when examining the maintenance and change of cultural stereotypes, it is desirable to examine it from both individual and collective perspectives. To the extent that cultural stereotypes are socially shared ideations (Levine, Resnick, & Higgins, 1993; Resnick, Levine, & Teasley, 1991), they are likely to play a significant role not only in the individual's cognitive processes but also in the information processing within collectives (Harasty, 1997; Hinsz, Tindale, & Vollrath, 1997; Ruscher & Hammer, 1994; Stangor & Schaller, 1996), as in communicating to others informally and discussing social issues in groups (e.g., van Dijk, 1987; Wetherell & Potter, 1991).

However, as shown in a later review, the literatures on individual and collective remembering paint somewhat different pictures about the implication of information retrieval on stereotype maintenance and change. On one hand, the individual recall literature implies that social stereotypes may change with each individual's effort. It is often found that SI information is better recalled than SC information under the experimental condition where people are given the opportunity to consider all relevant information carefully. On the other

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hand, the collective remembering literature implies that social stereotypes are likely to persist by virtue of their involvement in collective information processing. Experiments often show an advantage of shared as opposed to unshared information within a collective. As SC information is likely to be shared and SI information unshared, the collective remembering literature appears to contradict the individual recall literature.

Does this mean stereotypes are likely to be maintained through collective remembering despite the process of individual remembering? Even if individuals retrieve SI information and communicate it to others, is the end result of the communication process likely to be persistence of the stereotypes? To put it differently, do cultural stereotypes persist through collective processes even if individuals' information retrieval works in favor of their change? This article attempts to examine this question.

INDIVIDUAL RECALL OF STEREOTYPE-RELEVANT INFORMATION

The literature about the effect of stereotypes on individual memory is extensive, and its interpretation is somewhat mixed. Both Stangor and McMillan (1992) and Rojahn and Pettigrew (1992) independently conducted meta-analyses about the effect of expectation (stereotype-based or otherwise) on memory (including such classical studies as Hastie & Kumar, 1979; Srull, 1981; Srull, Lichtenstein, & Rothbart, 1985; Wyer & Martin, 1986), and both concluded that expectation-inconsistent information was remembered better than expectation-consistent information when aggregated across a number of experiments. However, Stangor and McMillan (1992) argued that expectation-consistent information is more likely to be remembered better than expectation-inconsistent information in most social contexts, whereas Rojahn and Pettigrew (1992) argued for the opposite. Following this, Fyock and Stangor (1994) performed a meta-analysis of the literature specifically about the effect of stereotype-based expectation on memory. They found that when presented with both SC and SI information, people tend to remember SC information slightly better than SI information ($d = .17$).

Studies published after the Fyock-Stangor review concentrated on identifying the mechanism that moderates the effect of stereotype on recall. These studies found that when observers have sufficient cognitive resources at their disposal (ability) and are motivated to use them to process information in an elaborate manner (motivation), SI information has a recall advantage over SC information. It has been suggested that the elaborate processing of SI information entails a reconciliation of inconsistencies among various pieces of information pertaining to the stereotyped group. However, a lack in

ability or motivation will result in better recall of SC than SI information. Empirical evidence generally supports this notion.

Macrae, Hewstone, and Griffiths (1993) and Dijksterhuis and van Knippenberg (1995) manipulated the cognitive resource available to the participants. Those who were required to rehearse an eight-digit number (Macrae et al., 1993) or given only 1.8 seconds (as opposed to 10 seconds) (Dijksterhuis & van Knippenberg, 1995) showed a recall advantage of SC information. However, when the participants were not given a distracter task or were given enough time to process information, they recalled SI information better than SC information. In addition, Dijksterhuis, van Knippenberg, Kruglanski, and Schaper (1996) showed in two experiments that the participants with a high need for closure (i.e., motivated to settle with a simple cognitive structure and therefore not motivated to mull over inconsistencies among the behavioral information) (Kruglanski & Webster, 1996) recalled SC information more than SI information. This tendency was not observed, however, among those with a low need for closure.

To be sure, the effect of recall of stereotype-relevant information on people's belief in stereotypes may not be so straightforward. Individuals' better recall of SI information may not always mean that their judgments about group stereotypes change in keeping with the retrieved information. Nonetheless, the recall-judgment link seems generally strong for judgments about groups (as opposed to individuals). Hamilton and Sherman's (1996) review of group impression formation suggests that people make judgments on the basis of retrieved information (memory-based) rather than updating that information online, the former being the process that strengthens the recall-judgment relation according to Hastie and Park (1986). In line with this reasoning, those who retrieve SI information about a group tend to evaluate the group in a less-stereotyped manner (e.g., Dijksterhuis et al., 1996). Furthermore, when individually retrieved information is communicated to others, the information, whether SC or SI, is likely to have a commensurate effect on both the recipient of the information and the prevalence of SC relative to SI information in the collective information pool.

Collective Remembering of Stereotype-Relevant Information

Bartlett's (1932) *Remembering: A Study in Experimental and Social Psychology* was probably the first experimental attempt at examining the collective side of remembering. Bartlett initiated the use of the method of serial reproduction. The serial reproduction paradigm allows us to examine cumulative effects of multiple minds. Generally, Bartlett found that information contained in the original stimulus was lost over the transmission chain;

however, the materials that were consensually held by, and therefore familiar to, the people involved in the serial reproduction or group memory were reproduced more than materials that were unfamiliar to them. For instance, when an Amerindian story of "The War of the Ghosts" was given to a serial reproduction chain consisting of Cambridge University undergraduates in 1920s England, a canoe was modified to a boat and "something black" that came out of a dead man's mouth became a spirit; generally, the unfamiliar folk tale was reconstructed into an intelligible tale of a warrior. He called this process conventionalization, that is, a transformation of the unfamiliar into a conventional form.

Later, Allport and Postman (1947) used the serial reproduction method and showed that the process of conventionalization also operates with regard to the racial stereotype in the United States. In one study, they showed a picture of a well-dressed Black man and a White man with the latter holding a razor in his hand. After this was serially reproduced (six to seven people), the Black man ended up holding a razor in three of the eight reproductions published in their book. This modification of the transmitted tale seems in line with the then-held stereotypes of African Americans in the United States, suggesting that serial reproductions tend to produce SC materials. Haque and Sabir (1975) replicated a similar result in Pakistan when they examined one chain of serial reproduction about Indian soldiers by Pakistani students. This was done when the two countries were in conflict, and stories about an Indian army unit was modified in line with the Pakistani stereotypes of them as lazy and undisciplined. Cumulative effects of the collective processing of information appear to favor the reproduction of culturally shared, SC information.

Despite their pioneering importance, the results of the serial reproduction experiments are still inconclusive for several reasons. First, previous experiments seem to have been conducted under the experimental condition that is less tight than the current standards demand. For instance, the condition in which Bartlett's (1932) original experiments were conducted is unclear from his writing (Kintch, 1995). To begin, his instructions to the participants have never been recorded, although the instructions alone can alter the results significantly in a serial reproduction experiment (Gauld & Stephenson, 1967). Allport and Postman (1947) apparently conducted their serial reproduction experiments in the presence of some audience. Their participants were often drawn from a group of audience, and an experiment was conducted in front of them. The presence of an audience would dramatically alter the experimental condition from the typical individual memory experiment. Haque and Sabir (1975) used only one serial reproduction chain. More important, none of the stud-

ies systematically examined the relative retention of SI versus SC information. When a condition similar to those in individual recall experiments is provided for the participants in a serial reproduction experiment, they may collectively retain SI information more than SC information. This question has never been raised.

It should also be noted that the recent studies on the use of stereotypes in conversations (e.g., Harasty, 1997; Ruscher & Hammer, 1994; Ruscher, Hammer, & Hammer, 1996) examine a phenomenon somewhat different from the collective remembering phenomenon within the serial reproduction paradigm. I will discuss this point later in the Discussion section.

Present Experiment: Examining the Individual and Collective Remembering

To examine the individual and collective remembering, this article reports an experiment that used Bartlett's (1932) method of serial reproduction. Given the prevalence of stories and narratives in everyday communication (Bruner, 1990; see Kashima, 1997, for a review), a narrative was used as a stimulus. The story related an episode about a man and a woman who exhibited gender SC and SI behaviors. In the present experiment, the condition in which participants received SC and SI information was controlled. The serial reproduction paradigm should enable us to examine both the individual and collective remembering within a single experiment. This is because the first person in a serial reproduction chain essentially participates in a study of the individual remembering; however, subsequent participants in the chain must cope with the information reproduced by the preceding participants. The text reproduced at the end of a serial reproduction chain by necessity shows cumulative effects of the group of people who have contributed to its production along the chain. Given the ambiguity in the literature, it was difficult to make a clear prediction. However, it may be anticipated that SI information is retained more than SC information earlier in the serial reproduction chain (in line with the individual remembering literature) but that SC information is more pervasive toward the end of the chain (in line with the collective remembering literature).

An additional complication arose because the present experiment used a complex narrative, whereas the past studies in individual remembering of stereotype-relevant information typically used a list of behavioral episodes. Although it is well established that information relevant for a narrative's main plot is better recalled than that which provides a background (e.g., Mandler & Johnson, 1977; for a review, see Hastie, Park, & Weber, 1984; Kashima, 1997), it is unclear whether a recall advantage of SI information for individual remembering

would obtain when the information is relevant for the story plot, when it is not relevant, or regardless of its relevance. In the absence of a principled way of predicting results, no prediction was made, although the plot relevance of information was included in the design.

Furthermore, two instruction conditions were included in the design because the instruction given by Bartlett (1932) in his original studies was unclear. The participants were instructed either to remember (memory condition) or to tell a story (storytelling condition). The past research on cognitive tuning (see Guerin & Innes, 1989; Zajonc, 1960) has shown that people who anticipate a transmission of information tend to make coherent their beliefs and outputs. With regard to the current experiment, however, the storytelling instruction, relative to the memory instruction, may not have a clear effect on the content of the reproduction. This is because people are likely to try to make sense of a story even if they do not expect it to be communicated. The storied nature of the stimulus may compensate for the effect of the instruction to communicate even in the memory condition.

Finally, the participants' gender was also included as part of the design given that the experiment examined gender stereotypes. This is particularly important because intergroup context may moderate the stereotype-memory link. Bardach and Park (1996) found that their participants recalled SI information better than SC information, but this general pattern was more pronounced for the participants' recall of the opposite gender target than for the same gender target. The authors argued that this is because one's stereotype about his or her outgroup is more homogeneous and coherent than that about his or her ingroup. SI information with a tighter stereotype would be more salient than that with a more heterogeneous stereotype; therefore, the former is more likely to trigger a deeper processing of SI information than is the latter. Nevertheless, it is important to note that this effect was obtained when a list of behavioral episodes was used as stimuli. When a more complex stimulus, that is, a story, is used as a stimulus, it is unclear whether the same results would obtain. The boundary condition of the intergroup context effect on the reproduction of stereotype-relevant information also was examined.

METHOD

Participants

The study included 30 males and 30 females who volunteered to participate in the experiment. Their ages ranged from 18 to 40, with the average age of 26 years. A total of 12 five-person serial reproduction chains (6 male and 6 female chains) were constructed.

Stimulus Material

A short story was written, which described a series of events associated with James and Sarah's plan to entertain James's employer by holding a dinner party. The story consisted of 59 propositions (expressed in phrases, clauses, or sentences; see Appendix for text). Then, six independent judges classified each of the propositions into plot-relevant and background propositions. Each of these kinds was then further classified into gender-stereotype-relevant or gender-neutral propositions. The gender-stereotype-relevant propositions were then categorized into male SC, male SI, female SC, and female SI propositions. When there was a disagreement, the proposition was rewritten to make its stereotype and plot relevance clearer. In the end, 22 propositions were classified as irrelevant to gender stereotypes; the rest were judged to be clearly relevant to gender stereotypes. All male or female stereotype-relevant propositions were classified into a two-way classification scheme: plot relevance (plot-relevant vs. background) crossed with stereotype consistency (SC vs. SI). The breakdown and examples of the propositions are given in Table 1.

Procedure

All participants were told that the study was about text comprehension. Depending on the condition, different instructions were given. The instructions in the memory condition were as follows:

This is [a memory experiment]. I would like you to read one piece of writing and do [some memory tasks] later on. I will show you the text a student wrote and give you a few minutes to read it twice. [Your task is to remember it as accurately as possible, word for word, so that you can reproduce it later.] It is important that you understand the text as well as you remember it. I will ask you some questions about it later on. Are you ready? Here is the writing. Please begin.

The bracketed parts of the above instructions were changed for the storytelling condition.

This is [an experiment about how people communicate a story to another person]. I would like you to read one piece of writing and do [some tasks] later on. I will show you the text a student wrote and give you a few minutes to read it twice. [Your task is to remember it so that you can tell the story to another person in your own words. The next person will then communicate it to another person.] It is important that you understand the text as well as you remember it. I will ask you some questions about it later on. Are you ready? Here is the writing. Please begin.

A participant at the first position in each chain was then given the stimulus story and read it twice at their

TABLE 1: Breakdown and Examples of the Types of Propositions Included in the Story

<i>Stereotype</i>	<i>N</i>	<i>Example</i>
Male		
Plot relevant		
Consistent	4	This particular Saturday is extremely important because they are entertaining James's employer.
Inconsistent	4	James is whipping the cream for desert.
Background		
Consistent	5	James takes the opportunity to choose the appropriate wine.
Inconsistent	3	That morning, James also cleans the house.
Female		
Plot relevant		
Consistent	5	Sarah has set up the kitchen and makes some initial preparations for dinner.
Inconsistent	6	Sarah tells James that she had so much fun drinking with the girls.
Background		
Consistent	5	Sarah even gets her hair done for the occasion.
Inconsistent	3	She yells to James that the girls are down at the Royal (a pub).

own pace. Bartlett (1932) also told his participants to read a story twice, and this ensured that the participants had enough time to mull over the story. After the reading time, they were given a distracter task for 5 minutes—drawing a floor plan of their own house. Participants then reproduced the story according to their instructions. The participants were debriefed afterward.

To increase the readability of the reproductions for subsequent people, they were all typed verbatim, including spelling and grammatical errors. Those who were later in a chain were given retyped stories reproduced by the immediately preceding participants in the chain. They were all told to read the story twice.

RESULTS

The protocols were coded for the type of proposition reproduced by two independent coders who were blind to the instruction conditions. A reproduced proposition was scored as accurate if it retained the gist of the original proposition. The rate of agreement was 95% overall. A disagreement was resolved by discussion. The final coding was used for further analysis.

For the male and female characters in the story, the proportion of the four types of propositions reproduced by each participant was computed. The four types were plot-relevant SC, plot-relevant SI, background SC, and background SI. A six-way factorial analysis of variance (ANOVA) was conducted on the proportion reproduced, with participant gender (male vs. female chain) and instruction condition (storytelling vs. memory) as between-participants factors and plot relevance of information (plot-relevant vs. background), target gender (male vs. female target), stereotypicality (SC vs. SI), and position in serial reproduction chain (1st to 5th position) as within-participants factors. The results of this ANOVA are reported in two parts: effects of stereotypicality and serial position, and intergroup context effect.

Effects of Stereotypicality and Serial Position

To examine the individual and collective remembering performances, effects involving stereotypicality and position are first reported. Note that the literature implies that people reproduce SI information more than SC information earlier in the chain but SC information more than SI information later. This implies a Position \times Stereotypicality interaction effect. Although this two-way interaction effect was not reliable, $F(4, 32) = .41$, *ns*, there was a highly significant three-way interaction of plot, stereotypicality, and position, $F(4, 32) = 19.15$, $p < .001$.¹ For plot-relevant information, SI information was reproduced more than SC information in the beginning; however, later, the advantage of SI information was reversed toward the end of the chain. By contrast, for background information, SC information was reproduced more than SI information throughout the chain (see Figure 1). It is important to note that this three-way interaction was not qualified by other higher order interaction effects, suggesting that it did not depend on the levels of the other variables.

Intergroup Bias in Serial Reproduction

Despite the previous finding, intergroup context did not influence the relative advantage of SC and SI information in a straightforward manner. An intergroup bias implies that men reproduce female SI more than female SC information but that women reproduce male SI more than male SC information. This pattern is indicated by a significant three-way interaction involving Participant Gender \times Target Gender \times Stereotypicality. Note that this three-way interaction provides a precise contrast relevant for the detection of an intergroup bias. However, it was not reliable, $F(1, 8) = 1.91$, $p = .204$.

However, two four-way interaction effects involving this three-way interaction were significant.² One was an

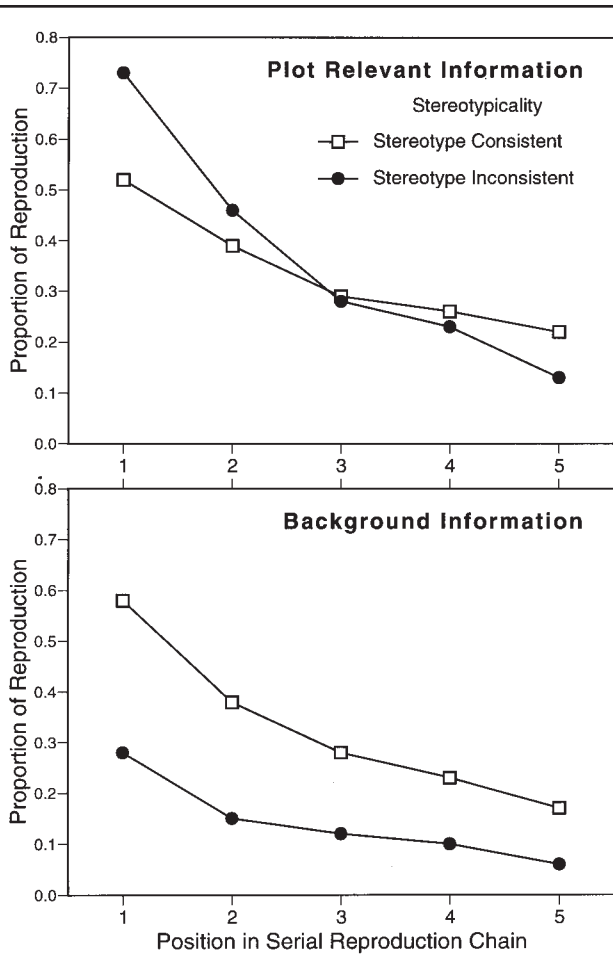


Figure 1 The means of a Plot Relevance \times Stereotypicity \times Position interaction effect.

Instruction \times Participant Gender \times Target Gender \times Stereotypicity effect, $F(1, 8) = 6.56, p < .05$. The relevant means are presented in Table 2.

Inspection of the means suggested that an intergroup bias was clearly absent in the memory condition. Instead, both male and female participants showed a better reproduction of male SC and female SI information. To explore this observation further, a mixed-design ANOVA was conducted for the memory condition. The independent variables were participant gender, target gender, and stereotypicality. The dependent variable was the proportion of reproduction averaged across all positions and plot relevance. A three-way interaction was unreliable, $F(1, 4) = 1.00, ns$. Consistent with the observation, there was a significant Target Gender \times Stereotypicality interaction, $F(1, 4) = 19.14, p < .01$.

The pattern of the means for the storytelling condition was more complex, however. The male participants showed a pattern consistent with an intergroup bias. They reproduced more female SI information than SC information but less male SI information than SC infor-

mation. Nonetheless, the female counterparts did not exhibit an intergroup bias. A mixed-design ANOVA comparable to the memory condition showed that a Participant Gender \times Target Gender \times Stereotypicality effect was marginally significant, $F(1, 4) = 5.98, p = .071$, in keeping with the observation. A further ANOVA involving target gender and stereotypicality was conducted for male and female participants separately. For men, a Target Gender \times Stereotypicality interaction was marginally significant, $F(1, 2) = 9.98, p = .087$; for women, this interaction was not reliable, $F(1, 2) = .38$.

There was also a Position \times Participant Gender \times Target Gender \times Stereotypicality effect, $F(4, 32) = 4.30, p < .01$. The relevant means are displayed in Table 3. Again, the pattern of the means did not show a clear intergroup bias. Throughout the reproduction chain, men seem to exhibit a pattern of means in agreement with an intergroup bias. They reproduced more SI information than SC information for the female target, but this was reversed for the male target. Nonetheless, women did not exhibit this pattern. To explore this observation, a series of three-way ANOVA (Participant Gender \times Target Gender \times Stereotypicality) was conducted separately for each reproduction position. The dependent variable was the proportion of reproduction averaged across plot relevance. These analyses showed that a Participant Gender \times Target Gender \times Stereotypicality effect was significant only for the second reproduction. Relevant F statistics are included in Table 3. These three-way ANOVAs were then followed up by two-way ANOVAs for male and female participants separately. These follow-up analyses showed that a Target Gender \times Stereotypicality interaction was significant for men for the second, third, and fourth reproductions, although a comparable effect was marginally significant for the first and fifth reproductions as well. By contrast, female participants' pattern of the means did not exhibit an intergroup bias at all. Relevant F statistics are reported in Table 3.

DISCUSSION

The present pattern of finding is in general agreement with both the individual and collective literatures on remembering: a recall advantage of SI information for the individual but a reproduction advantage of SC information through multiple individuals. Apparently, both sets of findings do obtain. Nevertheless, a recall advantage of SI information was observed only under a circumscribed condition, that is, only in an earlier part of the reproduction chain when the information was relevant to the story plot. When a story is transmitted through a chain of multiple individuals, SC information tends to remain in the story. Thus, stereotypes appear to be maintained in the serial reproduction of narratives.

TABLE 2: The Means of the Proportion of Reproduction for the Condition × Participant Gender × Target Gender × Stereotypicality Interaction

	Participant Gender	Target Gender			
		Male		Female	
		Consistent	Inconsistent	Consistent	Inconsistent
Memory	Male	.37	.22	.23	.29
	Female	.62	.29	.32	.33
$F(1, 4)^a$	1.00 ($p = .375$)				
Story	Male	.48	.19	.14	.33
	Female	.29	.22	.17	.15
$F(1, 4)^a$	5.98 ($p = .071$)				

a. F statistic for the Participant Gender × Target Gender × Stereotypicality interaction effect for a given instruction condition.

TABLE 3: The Means of the Proportion of Reproduction for the Position × Participant Gender × Target Gender × Stereotypicality Interaction

Participant	Target	Stereotypicality	Position				
			1	2	3	4	5
Male	Male	Consistent	.67	.55	.39	.30	.23
		Inconsistent	.47	.24	.14	.12	.01
	Female	Consistent	.46	.22	.13	.01	.01
		Inconsistent	.57	.36	.25	.26	.11
Female	Male	Consistent	.60	.48	.42	.41	.39
		Inconsistent	.52	.34	.21	.11	.01
	Female	Consistent	.48	.31	.19	.14	.11
		Inconsistent	.46	.27	.20	.16	.12
All participants: $F(1, 10)^a$			2.96	7.19*	0.87	0.02	0.03
Male participants only: $F(1, 5)^b$			6.03	20.72**	10.30**	12.45*	4.24
Female participants only: $F(1, 5)^c$.70	.93	3.64	12.05*	6.88*

a. F statistic for the Participant Gender × Target Gender × Stereotypicality interaction for a given position.

b. F statistic for the Target Gender × Stereotypicality interaction for male participants at a given position.

c. F statistic for the Target Gender × Stereotypicality interaction for female participants at a given position.

* $p < .05$. ** $p < .01$.

As suggested by Stangor and McMillan (1992), SC information may be retained better than SI information in many social contexts.

One potentially novel finding is the role played by the plot relevance of information in the processing of stereotype-relevant information. In retrospect, the recall advantage of plot-relevant SI information may be analogous to the finding reported by Dijksterhuis and van Knippenberg (1996). They suggested that implicational relations among pieces of stereotype-relevant information may play a role in moderating the recall of SC and SI information. If a recall advantage of SI information is due to the observers' attempt at reconciling their inconsistencies with SC information, to the extent that SC and SI information are not descriptively related to each other, people may not even realize the SI information as inconsistent and therefore needing to be reconciled with the SC information. Consistent with this reasoning, Dijksterhuis and van Knippenberg (1996) found a recall advantage of SI over SC information only when SC and SI information are descriptively related, that is, when a professor was described as exhibiting intelligent and stu-

pid behaviors (descriptively related) but not when a professor was described as exhibiting intelligent and aggressive behaviors (descriptively unrelated). Analogously, pieces of plot-relevant SC and SI information are descriptively related to each other by virtue of their relevance to the overarching plot structure. This may have prompted the participants to be engaged in more elaborative encoding of the information, leading to an advantage of SI information. This implies that by constructing a story in a clever way, one may be able to facilitate the retention of SI information in a story, thereby aiding a change of stereotypes.

Intergroup context played a complex role in this experiment, perhaps due to the nature of the stimulus. For male participants, the results could be interpreted in general terms of the motive to make sense of the story. According to Bardach and Park (1996), one tends to engage in more elaborative processing of SI rather than SC information pertaining to one's outgroup. Male participants in the storytelling condition did show a marginally reliable tendency to engage in this process. Although the instruction to tell a story may not have a

strong enough effect by itself, when multiplied by an intergroup context effect, the motive to process information in an integrative manner may have been sufficiently strong to produce the Reliable Instruction \times Participant Gender \times Target Gender \times Stereotypicality effect. For male participants, an intergroup bias seems to be present throughout the reproduction chain. By contrast, female participants did not show a clear bias regardless of the conditions. Nonetheless, these findings of gender differences in intergroup bias should be interpreted cautiously because the results are likely to be limited to the story used in the experiment.

The present experiment has some limitations. First, the number of pieces of SC and SI information was not completely balanced. Due to the fact that some slight variation in the distribution of expectation-consistent and -inconsistent information could alter the results (e.g., Srull, 1981), it is desirable to balance the stimulus. In addition, there is a more serious problem. The present results may be explained in terms of some inherent memorability of the items used as stereotype-relevant information. For instance, "a man mowing a lawn" may be more memorable than "a man slicing a carrot" simply because mowing a lawn may be an activity easier to remember and to communicate than slicing a carrot, rather than because these activities are male stereotypical or not. The finding that SI information was reproduced more than SC information earlier in the reproduction chain argues against this interpretation. Overall, however, these limitations do not appear to threaten the generality of the results. In a study conducted in our laboratory using a different story, the reproduction advantage of SC information through collective remembering was observed when these problems were rectified (Kashima, 1998).

Reproducing Narratives of Cultural Stereotypes

A number of results that are somewhat at odds with previous findings may be interpreted in terms of an overwhelming effect due to the nature of the stimulus, that is, a story. When people read a story narrated by someone else, its inherently meaningful nature may invite them to engage in a sense-making activity, that is, to perform more integrative processing of the information. Although instructions to memorize stimuli typically reduce the recall advantage of SI information (see Stangor & McMillan, 1992), there was no straightforward effect of instruction (memory vs. storytelling) in the present experiment. Even in the memory condition, the participants may have engaged in a high level of elaborative encoding because of the storied nature of the stimulus, thus producing a better recall of SI information for the early positions in the serial reproduction chain.

The present experiments showed that although the individual may recall SI information more than SC information from a story under some circumstances, when the story is transmitted through multiple individuals' minds, SC information tends to remain in the story, whereas SI information may drop out. As Allport and Postman (1947) put it,

As [a story] circulates, it is inevitably divested of its idiosyncratic embellishments. Common words are used to convey common meanings. Unfamiliar vocabulary, subtle verbal twists, individuality of interpretation all are deleted. When diverse personalities spread a tale, only the least common denominator can survive. (p. 156)

The least common denominator is the consensually held cultural stereotypes.

This pattern of finding appears to be consistent with more recent research using the group memory paradigm (e.g., Perlmutter, 1953; Stephenson, Brandstatter, & Wagner, 1983), in which individuals learn stimuli and retrieve them for use in face-to-face interacting groups. Stasser and his colleagues (Stasser, Taylor, & Hanna, 1989; Stasser & Titus, 1985, 1987; also see Gigone & Hastie, 1993; Hinsz, 1990) showed the significance of shared information as opposed to unshared information in group discussion and decision making. Generally, people tend to mention consensually held information more often than unshared information in group discussion; therefore, shared information tends to influence group decisions more than unshared information. Stephenson, Clark, and Wade (1986) also found that dyads and four-person groups tended to recall more conventional aspects of staged police interrogations. Although these studies did not directly examine the role played by stereotypes in group memory, they all point to the retrievability of consensually held information, a kind of cultural stereotype.

Nonetheless, the serial reproduction paradigm is significantly different from the group memory paradigm. In the former, only the transmitter has the relevant information, whereas everyone in the group discussion is given the relevant information. This imbalance in information may create different types of dynamics in the serial reproduction when compared to the group memory paradigm. In fact, more recent research on the use of stereotypes in dyadic conversation suggests that people may not always discuss SC information more than SI information. For instance, Ruscher and Hammer (1994) described a hypothetical person with a series of personality traits that are consistent and inconsistent with the stereotype of alcoholics, but the label of "alcoholic" was presented either before or after the traits. When the label was given after the traits, the dyads spent more time

discussing SC information; however, there was no difference when the label was given before the traits. Ruscher et al. (1996) likewise showed that their dyads spent more time discussing SC information when they were told to form a consensual impression of a target person. However, this tendency was not observed when the individual members of the dyads were told to form their own impressions or when they were told that their judgments would later be compared to professional psychologists' diagnosis. Harasty's (1997) study, in which same-sex dyads were told to discuss "contemporary American men (women)" without any further information, did not show any bias with regard to SC or SI information. Clearly, similarities and differences between the group memory and the serial reproduction paradigms need to be examined further.

Overall, these considerations suggest that "sharedness" of stereotypes may be a significant factor that contributes to the information processing involving cultural stereotypes. The point that cultural stereotypes are shared has often been assumed by early theorists, including Lippman (1922), who is credited to have coined the term "stereotype." Recently, however, some researchers (e.g., Hamilton, Stroessner, & Driscoll, 1994; Judd & Park, 1993) argued that stereotypes can be understood as individual beliefs, whereas others wished to retain the sharedness as a central aspect of the definition of stereotype (e.g., Haslam, 1997; Haslam et al., 1996; Stangor & Lange, 1994; Stangor & Schaller, 1996). Whether the definition of stereotype should include sharedness is a theorist's choice. However, cultural sharedness may need to be invoked to explain the reproductive advantage of SC information in the serial reproduction of narratives.

Why is SC Information Collectively Reproduced?

Why does serial reproduction tend to reproduce cultural stereotypes despite the individual remembering that often favors the opposite tendency to recall SI information? Clearly, Bartlett's (1932) explanation does not work by itself. He explained the process of conventionalization by citing shared schemata. To put it simply, as information tends to be assimilated into schemata, any information that cannot be assimilated may be lost in the collective information processing system. Obviously, this cannot explain the individual recall performance. Yet, the individual recall model, which emphasizes the individual's effort to reconcile inconsistencies, cannot, by itself, explain the reproductive advantage of SC information in the serial reproduction.

Nevertheless, it may be possible to modify the model of individual remembering to explain this paradoxical finding. Participants in a later part of a serial reproduc-

tion chain may not have been as motivated to reconcile inconsistencies as those in earlier positions. The participants who were in the later part of the reproduction chain may have felt that they could not make sense of the stories because a fair amount of information was already lost by then. They may have given up on a sense-making effort and opted for SC information, which is easily comprehensible. The SI information that could not be made sense of was forgotten. Once it is lost in a chain, it is highly unlikely that subsequent participants could regain it.

Another explanation gives more weight to the role of communication. Instead of losing motivation to make sense of SI information, the participants in a later part of a chain may have decided to communicate only the bits of information that they could make sense of. After all, it is rational to communicate what they believe to be true (maxim of quality) (Grice, 1975) in a clear and unambiguous manner (Grice's maxim of manner). The communicator may question the validity of SI information in a half-lost story and may decide it will be unclear to the recipient of the communication anyway, choosing not to reproduce for the subsequent participants in a serial reproduction chain.

It is unclear at this stage whether the loss of SI information in the serial reproduction of narratives can be explained solely in terms of a loss in the individual participant's memory process or a significant role is played by a loss in the communication process from one individual to the next. As Zajonc and Adelman (1987) note, communication and cognition constitute two inseparable aspects of the information processing. Both the intrapersonal memory and interpersonal communication processes may be operative. The next challenge is to examine these processes further and look for variables that may moderate the process of retaining stereotype-relevant information in the collective information processing system. In addition to changing stereotypes in an individual, it may provide an alternative method to change cultural stereotypes or indeed a culture as a whole.

APPENDIX **Story Used in Experiment**

Sarah and James live together in a small apartment in Melbourne./ James is an up-and-coming executive in a top city firm (BMC)/ where Sarah also works as a highly competent personal assistant. (BFC)/ This particular Saturday is extremely important because they are entertaining James's employer; (PMC)/ James's promotion is at stake and he wishes to make a good impression. (PMC)/ James has been awaiting this for a long time, (PMC)/ and the possibility of a raise is crucial for their plans to start a family./ Sarah has promised to cook a

beautiful three-course meal/ and to make it a successful evening altogether. (PFC)/

They spend the morning shopping/ at Sarah's favorite, exclusive delicatessens. (BFC)/ Sarah even gets her hair done for the occasion (BFC)/ while James takes the opportunity to choose the appropriate wine. (BMC)/ That morning, James also cleans the house, (BMI)/ vacuuming through the entire house (BMI)/ and arranging some flowers. (BMI)/ Sarah has set up the kitchen and makes some initial preparations for dinner, (PFC)/ which she will finish later that afternoon. (PFC)/ She then makes lunch (BFC)/ and they take a break together./

The phone rings./ It's a couple of Sarah's mates from squash; (PFI)/ she hangs up and rushes into the bedroom./ She yells to James that the girls are down at the Royal (BFI)/ and that she's just going to pop down and have a few drinks with them. (PFI)/ She gives him a quick peck on the cheek (BFC)/ and says she won't be long. (PFI)/

Feeling good about the preparations for that evening,/ and confident it was going to run smoothly, (BMC)/ James settles down for an afternoon of Wide World of Sports. (BMC)/ This week they're crossing live to the Brazilian Grand Prix./ It was a good afternoon for a bit of TV./

James wakes to the phone ringing/ and it dawns on him that he's been asleep all afternoon. (PMC)/ He crawls off the couch/ but misses the phone./ Wandering into the kitchen, he sees the preparation for dinner;/ Sarah was not yet home./ Could it have been Sarah trying to ring?/ He tries her mobile but it isn't switched on/ and James begins to worry. (PMI)/ Sarah didn't usually stay at the pub this long, (PFI)/ and she had so much to do. (PFC)/ He realizes he must do something (PMI)/ and opens the cookbook placed on the bench. (PMI)/ He isn't exactly sure what Sarah had planned to cook./

It is 6 o'clock/ and James is whipping the cream for dessert, (PMI)/ he hears voices and the door slam shut./ Laughing, Sarah runs in/ and gives James a big hug. (BFI)/ James angrily pushes her away, yelling "Where the hell have you been?" (BMC)/ Sarah, still laughing, (BFI)/ tells James that she had so much fun drinking with the girls (PFI)/ that she invited Brooke and Nat back for the dinner party. (PFI)/

As Sarah and her friends went to freshen up, (PFC)/ the doorbell rang./ James couldn't believe this was happening./

NOTE: Each proposition is separated by a slash. PMC = plot-relevant male SC, PFC = plot-relevant female SC, PMI = plot-relevant male SI, PFI = plot-relevant female SI, BMC = background male SC, BFC = background female SC, BMI = background male SI, and BFI = background female SI.

NOTES

1. Some of the lower order main and interaction effects involved in this three-way effect were significant. Consistent with expectation, a plot main effect was significant, $F(1, 8) = 24.06, p < .001$; plot-relevant information ($M = .35$) was reproduced more than background information ($M = .23$). There were two significant two-way interaction effects that involved plot: Plot \times Stereotypicality, $F(1, 8) = 12.89, p < .01$, and Plot \times Position, $F(4, 32) = 5.87, p < .001$. These effects, however, need to be interpreted within the context of the higher order effect.

2. Some of the lower order effects involved in the four-way effects also were significant. There was a main effect of target gender, $F(1, 8) = 24.50, p < .01$, and a main effect of stereotypicality, $F(1, 8) = 7.77, p < .03$. Information about the male target ($M = .34$) was reproduced more

than the female target ($M = .25$); stereotype-consistent (SC) information ($M = .33$) was reproduced more than stereotype-inconsistent (SI) information ($M = .25$). This effect was qualified by a Target Gender \times Stereotypicality interaction, $F(1, 8) = 25.50, p < .001$. SC information ($M = .45$) was reproduced more than SI information ($M = .23$) for the male target but SI information ($M = .28$) was reproduced more than SC information ($M = .22$) for the female target. The same pattern was observable only for plot-relevant information. There was an advantage of SC information for the male target but an advantage of SI information for the female target. However, for background information, SC information was reproduced more for both male and female targets. This was shown by a three-way effect of Target Gender \times Stereotypicality \times Plot Relevance, $F(1, 8) = 16.85, p < .01$. Again, these effects should be interpreted in light of the higher order interaction effects.

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